Project Introduction

Intelligent Automation Inc., (IAI) and University of Central Florida (UCF) propose to develop a comprehensive numerical test suite for benchmarking current and future high performance computing activities. The key innovation in this effort is development of a comprehensive numerical test suite for benchmarking current and future high performance computing activities. Our technical approach builds on our experience in cluster computing, distributed agents system, parallel model developments for High Performance Computing (HPC) and our teams expertise in these areas for problem selection. The developed benchmarking numerical suite (HPC benchmark suite NMx) will include (1) dense and unsymmetrical matrix problems faced in space aviation and problems in thermally driven structural response and radiation exchange, (2) implicit solution algorithms with production models and benchmarks for indefinite matrices and pathological cases (3) configurations scaling for large systems (64, 256, 512, 1024 distributed high performance system) in shared, distributed and mixed memory conditions (4) documentation for strengths, weaknesses, and limitations of the toolkits used together with recommendations and (5) precision and round-off studies on serial and parallel machines, comparison of solutions on serial and parallel hardware with study of wall clock performance with respect to the number of processors.

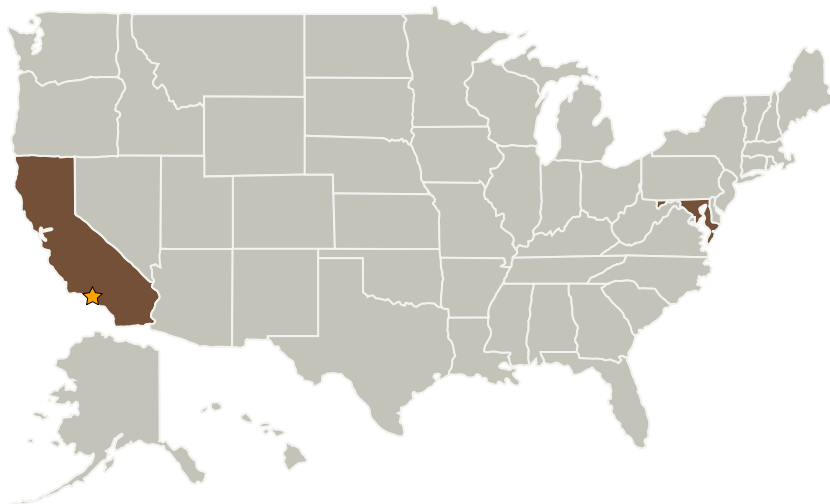## Primary U.S. Work Locations and Key Partners

HPC Benchmark Suite NMx, Phase I

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Organizations Performing Work	Role	Type	Location
⭐Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Intelligent Automation, Inc.	Supporting Organization	Industry	Rockville, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Transitions

▶ **January 2009:** Project Start

✔ **January 2010:** Closed out

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  └ TX11.6 Ground Computing
    └ TX11.6.2 Automated Exascale Software Development Toolset